

WHAT IS CLAIMED IS:

- 1 1. An intervertebral disc prosthesis comprising:
 - 2 (a) a first base plate comprising an exterior surface and an interior
3 surface, the interior surface having a first cup disposed thereon, the first cup defining
4 a first concave surface;
 - 5 (b) a second base plate having an exterior surface and an interior
6 surface, the interior surface having a second cup disposed thereon, the second cup
7 defining a second concave surface; the interior surface of the first base plate disposed
8 opposite the interior surface of the second base plate and the first concave surface
9 disposed opposite and facing the second concave surface; and
 - 10 (c) a disc insert disposed between the first and second cups, the
11 disc insert comprising two opposing convex surfaces capable of articulating with the
12 first and second concave surfaces of the first and second cups;
- 13 wherein at least one of the first and second cups is mounted to its base
14 plate through a vertically adjustable support.
- 1 2. The intervertebral disc prosthesis of claim 1, wherein the
2 vertically adjustable support comprises a threaded stem and the base plate defines a
3 tapped bore, and further wherein the threaded stem screws into the tapped bore such
4 that the distance between the cup and the base plate can be adjusted by rotating the
5 stem in the bore.
- 1 3. The intervertebral disc prosthesis of claim 1, wherein the
2 circumferential shapes of the concave surfaces of the cups are ellipsoidal.
- 1 4. The intervertebral disc prosthesis of claim 1, wherein the
2 circumferential shapes of the concave surfaces of the cups are circular.

1 5. The intervertebral disc prosthesis of claim 1, wherein the first
2 and second base plates are characterized by an anterior-posterior axis and the centers
3 of concavity of the first and second concave surfaces are offset posteriorly with
4 respect to the midpoint of the anterior-posterior axis.

1 6. The intervertebral disc prosthesis of claim 1, further including a
2 plurality of cables fastened between the first and second base plates for restricting the
3 rotational motion of the intervertebral disc prosthesis.

1 7. The intervertebral disc prosthesis of claim 1, wherein the first
2 concave surface and the second concave surface each comprise a flat strip running
3 through the apex of the concavity.

1 8. The intervertebral disc prosthesis of claim 1, wherein the at
2 least one cup mounted to its base plate through a vertically adjustable support is
3 characterized by a circumferential edge and a first notch extends into the
4 circumferential edge of the cup, and further wherein the base plate to which the at
5 least one cup is mounted is characterized by a circumferential edge and a second
6 notch extends into the circumferential edge of that base plate, such that the first and
7 second notches are disposed opposite and facing one another to provide a frame.

1 9. The intervertebral disc prosthesis of claim 8, further comprising
2 a tab disposed in the frame and fastened against the vertically adjustable support.

1 10. An intervertebral disc prosthesis comprising:

2 (a) a first base plate comprising an exterior surface and an interior
3 surface, the interior surface having a cup disposed thereon, the cup defining a concave
4 surface; and

5 (b) a second base plate having an exterior surface and an interior
6 surface, the interior surface having a knob disposed thereon, the knob defining a
7 convex surface, wherein the interior surface of the first base plate is disposed opposite
8 the interior surface of the second base plate, such that the cup and the knob fit
9 together to provide an articulating joint;

10 and further wherein at least one of cup or knob is mounted to its base
11 plate through a vertically adjustable support.

1 11. The intervertebral disc prosthesis of claim 10, wherein the
2 vertically adjustable support comprises a threaded stem and the base plate to which
3 the support is mounted defines a tapped bore, and further wherein the threaded stem
4 screws into the tapped bore such that the distance between the cup or knob and the
5 base plate can be adjusted by rotating the stem in the bore.

1 12. An intervertebral disc prosthesis assembly comprising:

2 (a) a first base plate comprising a circumferential edge, an interior
3 surface, an exterior surface and a first threaded groove extending into the
4 circumferential edge along the interior surface;

5 (b) a second base plate disposed opposite the first base plate, the
6 second base plate comprising a circumferential edge, an interior surface, an exterior
7 surface, and a second threaded groove extending into the circumferential edge along
8 the interior surface, the second threaded groove disposed opposite and facing the first
9 threaded groove; and

10 (c) a threaded rod that engages the first and second threaded
11 grooves of the first and second base plates.

1 13. The intervertebral disc prosthesis assembly of claim 12, further
2 comprising a joint disposed between the first and second base plates.

1 14. The intervertebral disc prosthesis assembly of claim 12,
2 wherein the interior surface of either the first or second base plate has a cup disposed
3 thereon, the cup defining a concave surface, and the other interior surface has a knob
4 disposed thereon, the knob defining a convex surface, wherein the concave surface of
5 the cup and the convex surface of the knob fit together to form an articulating joint.

1 15. The intervertebral disc prosthesis assembly of claim 12,
2 wherein the interior surface of the first base plate has a first cup disposed thereon, the
3 first cup defining a first concave surface, and the interior surface of the second base
4 plate has a second cup disposed thereon, the second cup defining a second concave
5 surface, and further wherein the disc prosthesis system further comprises a disc insert
6 comprising two opposing convex surfaces disposed between the first and second
7 concave surfaces.

1 16. The intervertebral disc prosthesis assembly of claim 12, further
2 comprising at least one flexible wire extending over at least one of the first and
3 second threaded grooves, wherein the wire flexes out of the way when the threaded
4 rod is screwed between the first and second threaded grooves and recoils back over
5 the face of the threaded rod when the rod has been fully screwed into place.

1 17. The intervertebral disc prosthesis assembly of claim 12,
2 wherein the threaded rod comprises a face defining at least one aperture that extends
3 over the circumferential edge of the first or second base plate and at least one of the
4 first or second base plates comprises a tapped hole along its circumferential edge that
5 may be aligned with the at least one aperture.

1 18. The intervertebral disc prosthesis assembly of claim 12,
2 wherein the threaded rod comprises a face defining at least one aperture that extends
3 over a vertebra when the disc prosthesis assembly is in place in an intervertebral
4 space.

1 19. An intervertebral disc prosthesis comprising:

2 (a) a first base plate comprising an exterior surface and an interior
3 surface, the interior surface having a first cup disposed thereon, the first cup defining
4 a first concave surface;

5 (b) a second base plate having an exterior surface and an interior
6 surface, the interior surface having a second cup disposed thereon, the second cup
7 defining a second concave surface; the interior surface of the first base plate disposed
8 opposite the interior surface of the second base plate and the first concave surface
9 disposed opposite and facing the second concave surface; and

10 (c) a disc insert disposed between the first and second concave
11 surfaces, the disc insert comprising an exterior wall forming two opposing convex
12 surfaces capable of articulating with the first and second concave surfaces of the base
13 plates, wherein the exterior wall defines a plurality of compressible helical slits.

1 20. The intervertebral disc prosthesis of claim 19, wherein the
2 plurality of helical slits are disposed in a substantially parallel relation.

1 21. An adjustable intervertebral disc prosthesis comprising an
2 intervertebral disc prosthesis characterized by a disc prosthesis height, the
3 intervertebral disc prosthesis comprising:

4 (a) means for simulating one or more degrees of motion of a
5 natural intervertebral disc; and

- 6 (b) means for adjusting the disc prosthesis height in situ.
- 1 22. A prosthetic vertebral assembly comprising:
- 2 (a) a prosthetic vertebral body comprising:
- 3 (i) a base having a superior end and an inferior end, the
- 4 superior end disposed opposite the inferior end;
- 5 (ii) a superior vertically adjustable support adjustably
- 6 mounted to the superior end of the base; and
- 7 (iii) an inferior vertically adjustable support adjustably
- 8 mounted to the inferior end of the base;
- 9 (b) a first intervertebral disc prosthesis mounted to the superior
- 10 vertically adjustable support; and
- 11 (c) a second intervertebral disc prosthesis mounted to the inferior
- 12 vertically adjustable support.
- 1 23. The prosthetic vertebral assembly of claim 22, wherein the base
- 2 comprises a threaded rod, the superior vertically adjustable support defines a first
- 3 tapped bore adapted to be screwed onto the superior end of the threaded rod and the
- 4 inferior vertically adjustable support defines a second tapped bore adapted to be
- 5 screwed onto the inferior end of the threaded rod.
- 1 24. The prosthetic vertebral assembly of claim 22, wherein at least
- 2 one of the first and second intervertebral disc prostheses has a vertically adjustable
- 3 disc height.
- 1 25. The prosthetic vertebral assembly of claim 22, wherein one or
- 2 both of the first and second intervertebral disc prostheses comprises:

3 (a) a first base plate comprising an exterior surface and an interior
4 surface, the interior surface having a first cup disposed thereon, the first cup defining
5 a first concave surface;

6 (b) a second base plate having an exterior surface and an interior
7 surface, the interior surface having a second cup disposed thereon, the second cup
8 defining a second concave surface; the interior surface of the first base plate disposed
9 opposite the interior surface of the second base plate and the first concave surface
10 disposed opposite and facing the second concave surface; and

11 (c) a disc insert disposed between the first and second cups, the
12 disc insert comprising two opposing convex surfaces capable of articulating with the
13 first and second concave surfaces of the first and second cups.

1 26. The prosthetic vertebral assembly of claim 22, wherein the base
2 further comprises a central collar that divides the threaded rod into an upper threaded
3 section and a lower threaded section, the central collar is characterized by an upper
4 surface, a lower surface and a circumferential edge.

1 27. The prosthetic vertebral assembly of claim 26, wherein the
2 superior vertically adjustable support is characterized by a circumferential edge and a
3 notch extends into the circumferential edge of the superior adjustable support; the
4 inferior vertically adjustable support is characterized by a circumferential edge and a
5 notch extends into the circumferential edge of the inferior adjustable support, and
6 further wherein the central collar comprises at least one notch extending into its
7 circumferential edge along its upper surface and at least one notch extending into its
8 circumferential edge along its lower surface, such that the at least one notch on the
9 superior adjustable support is disposed opposite and facing the at least one notch

10 along the upper surface of the central collar to provide a first frame and the at least
11 one notch on the inferior adjustable support is disposed opposite and facing the at
12 least one notch along the lower surface of the central collar to provide a second frame.

1 28. The intervertebral disc prosthesis of claim 27, further
2 comprising a first tab disposed in the first frame and fastened against the upper
3 threaded section of the threaded rod and a second tab disposed in the second frame
4 and fastened against the lower threaded section of the threaded rod.